We claim:

1. A brake actuator assembly for a park and hold brake system of a vehicle comprising:

(A) a brake pedal which is pivotal, under the imposition of manual operating forces, from an at-rest position, 1) through an operating stroke in which the vehicle's brakes are engaged and in which said brake pedal returns automatically to said at-rest position upon release of the manual operating forces to release the brakes, 2) through a locked position which is located beyond an end of said operating stroke, and 3) to an over-travel position which is located beyond said locked position;

(B) a brake pedal locking mechanism which cooperates with said brake pedal so as to 1) automatically latch said brake pedal in said locked position upon movement of said brake pedal into said locked position, thereby holding the brakes in their engaged condition upon release of the actuating forces, and 2) automatically unlatch said brake pedal from said locked position upon movement of said brake pedal into said over-travel position, thereby permitting return of said brake pedal to said at-rest position upon release of the actuating forces and releasing the brakes;

(C) an accelerator pedal; and

(D) a kickoff mechanism which couples said accelerator pedal to said brake pedal locking mechanism and which actuates said brake pedal locking mechanism to unlatch said brake pedal from said locked position upon actuation of said accelerator pedal.

2. An actuator assembly as recited in claim 1, wherein said locking mechanism has a single latch point which provides for a single locked position of said brake pedal and a single audible indication to an operator that said brake pedal has been depressed sufficiently to be latched in its locked position.

3. An actuator assembly as recited in claim 1, further comprising a toggle arm which cooperates with said locking mechanism so as to prevent relative contact between first and second components of said locking mechanism until said brake pedal approaches said locked position, thereby providing for said single point latching and said single audible indication.

4. An actuator assembly as recited in claim 1, wherein said locking mechanism comprises a cam on said brake pedal, a cam follower which engages said cam, a control arm which operatively cooperates with said cam follower, and an over-center spring which operatively communicates with both said cam follower and said control arm and which moves through an over-center position upon movement of said brake pedal into said locked position at the end of said operating stroke, thereby changing a biasing direction thereof from one forcing said cam follower downwardly to on drawing said cam follower upwardly.

5. An actuator assembly as recited in claim 4, wherein said cam is formed on said brake pedal and includes an arcuate portion which is engaged by said cam follower when said brake pedal is in said locked position.

6. An actuator assembly as recited in claim 5, wherein said cam follower comprises a swing arm which is positioned adjacent said brake pedal and a roller which is mounted on said swing arm so as to ride along said cam.

7. An actuator assembly as recited in claim 6, wherein a dog is provided on said swing arm and a detent is provided on said control arm, and wherein said locking mechanism is configured so that said dog engages said detent when said brake pedal is in said locked position.

8. An actuator assembly as recited in claim 6, wherein said kick-off mechanism comprises an arm which is mounted on said swing arm and which is engaged by said accelerator pedal upon actuation thereof so as to drive said swing arm to a position in which said swing arm is unlatched from said control arm.

9. An actuator as recited in claim 6, wherein said cam and said roller are configured such that, during unlatching of said brake pedal, said roller rides along said cam in a path that is at least generally tangential to a pivot arc of said swing arm, thereby facilitating unlatching of said brake pedal by said kick-off mechanism.

10. An actuator assembly as recited in claim 1, wherein said kick-off mechanism is configured to cooperate with said accelerator pedal so as to unlatch said brake pedal within an initial three inches of accelerator pedal movement from an at-rest position thereof.

11. A brake actuator assembly for a park and hold brake system of a vehicle comprising:

(A) a brake pedal which is pivotal, under the imposition of manual operating forces, from an at-rest position, 1) through an operating stroke in which the vehicle's brakes are engaged and in which said brake pedal returns automatically to said at-rest position upon release of the manual operating forces to release the brakes upon release of the actuating forces, 2) through a locked position which is located beyond an end of said operating stroke, and 3) to an over-travel position which is located beyond said locked position; and

(B) a brake pedal locking mechanism including a cam on said brake pedal, a cam follower which engages said cam, a control arm which operatively cooperates with said cam follower, and an over-center spring which operatively communicates with both said cam follower and said control arm and which moves through an over-center position upon movement of said brake pedal into said locked position at the end of said operating stroke position, thereby changing a biasing direction thereof from one pulling said cam follower downwardly to one pulling said cam follower upwardly.

12. An actuator assembly as recited in claim 11, further comprising

(A) an accelerator pedal; and

(B) a kickoff mechanism which operatively couples said accelerator pedal to said brake pedal locking mechanism and which actuates said brake pedal locking mechanism to unlatch said brake pedal from said locked position upon actuation of said accelerator pedal.

13. An actuator assembly as recited in claim 12, wherein said cam follower comprises a swing arm which is positioned adjacent said brake pedal and a roller which is mounted on said swing arm so as to ride along said cam, and wherein said kick-off mechanism comprises an arm which is mounted on said swing arm and which is engaged by said accelerator pedal upon actuation thereof so as to drive said swing arm to a position in which said over-center spring assumes said over-center position and releases said brake pedal.

14. An actuator assembly as recited in claim 11, wherein said control arm is mounted on said brake pedal and said cam follower comprises a swing arm which is positioned adjacent said brake pedal and a roller which is mounted on said swing arm so as to ride along said cam.

15. An actuator assembly as recited in claim 14, wherein a dog is provided on said swing arm and a detent is provided on said control arm, and wherein said locking mechanism is configured so that said dog is locked against said detent when said brake pedal is in said locked position.

16. An actuator assembly as recited in claim 15, further comprising a lug on said swing arm and a toggle arm which is mounted on said brake pedal and which selectively cooperates with said lug on said swing arm so as to prevent contact between said dog and said detent until said brake pedal approaches said locked position, thereby providing for single point latching and a single audible indication that the brake pedal has been depressed sufficiently to be latched in said locked position.

17. An actuator assembly as recited in claim 14, wherein said cam and said roller are configured such that, during unlatching of said brake pedal, said roller rides along said cam in a path that is at least generally tangential to a pivot arc of said swing arm during at least a portion of a brake pedal unlatching process, thereby facilitating unlatching of said brake pedal by said kick-off mechanism.

18. An actuator assembly as recited in claim 11, further comprising a support bracket on which said brake pedal, said locking mechanism, and said accelerator pedal are mounted such that said brake pedal and accelerator pedal are coaxially pivotal about a first axis and said swing arm is pivotal about a second axis which is parallel to but offset from said first axis.

19. A brake actuator assembly for a hydraulic braking system of a vehicle comprising:

(A) a brake pedal which is pivotal, under the imposition of manual operating forces, from an at-rest position, through an operating stroke in which the vehicle's brakes are engaged and in which said brake pedal returns automatically to said at-rest position upon release of the manual operating forces to release the brakes, and to a locked position which is located beyond an end of said operating stroke;

(B) a brake pedal locking mechanism which automatically latches said brake pedal in said locked position upon movement of said brake pedal into said locked position, thereby holding the brakes in their engaged condition, said brake pedal locking mechanism including a cam on said brake pedal, a swing arm, and a roller which is mounted on said swing arm and which rides along said cam;

(C) an accelerator pedal; and

(D) a kickoff mechanism which is mounted on said swing arm and which is engaged by said accelerator pedal upon accelerator pedal actuation to move said swing arm into a position that unlatches said brake pedal from said locked position, wherein said cam and said roller are configured such that, during at least a portion of a brake pedal unlatching process, said roller rides along said cam in a path that is at least generally tangential to a pivot arc of said swing arm, thereby facilitating unlocking of said lock mechanism by said kick-off mechanism.

20. A vehicle comprising:

(A) a plurality of wheels;

(B) a chassis supported on said wheels and having a floorboard; and

(C) a hydraulic braking system comprising

(1) a plurality of hydraulic brakes, each of which is associated with a corresponding one of said wheels,

(2) a hydraulic master cylinder in fluid communication with said brakes, and

(3) a brake actuator assembly which is coupled to said master cylinder, said brake actuator assembly being located entirely above said floorboard and including

a) a support bracket which is mounted on said vehicle above said floorboard,

b) a brake pedal which is mounted on said support bracket so as to be pivotal, under the imposition of manual operating forces, from an at-rest position, i) through an operating stroke in which the vehicle's brakes are engaged and in which said brake pedal returns automatically to said at-rest position upon release of the manual operating forces to release the brakes, ii) through a locked position which is located beyond an end of said operating stroke, and iii) to an over-travel position which is located beyond said locked position,

c) a brake pedal locking mechanism including a cam on said brake pedal, a cam follower which engages said brake pedal, a control arm which operatively cooperates with said cam follower, and an over-center spring which operatively communicates with both said cam follower and said control arm and which moves through an over-center position upon movement of said brake pedal into said locked position at the end of said operating stroke, thereby changing a biasing direction thereof from one pulling said cam follower downwardly to one pulling said cam follower upwardly,

d) an accelerator pedal which is pivotally mounted on said support bracket, and

e) a kickoff mechanism which couples said accelerator pedal to said brake pedal locking mechanism and which actuates said brake pedal locking mechanism to unlatching said brake pedal from said locked position upon actuation of said accelerator pedal.

21. A method of applying and holding a brake of a vehicle comprising:

(A) manually driving a brake pedal to pivot from an at-rest position and into an operating position; then

(B) manually driving said brake pedal through said operating position and to a locked position in which a locking mechanism latches said brake pedal in said locked position; then

(C) releasing said brake pedal while said brake pedal remains in its locked position; then

(D) unlatching said brake pedal from said locked position by selectively and alternatively

1) manually driving said brake pedal to an over-travel position which is located beyond said locked position and in which said locking mechanism automatically unlatches said brake pedal, and

2) manually driving an accelerator pedal into engagement with a kick-off mechanism to automatically manipulate said locking mechanism to unlatch said brake pedal; and then

(E) permitting said brake pedal to return to said at-rest position.

22. A method as recited in claim 21, wherein, during the step (B), said brake pedal is latchable in only a single locked position thereof and said locking mechanism provides a single audible indication to an operator that said brake pedal has been depressed sufficiently to be latched in said locked position.

23. A method as recited in claim 22, wherein, during said step (B), a control arm on said brake pedal swings into latching contact with a swing arm to latch said brake pedal in said locked position.

24. A method as recited in claim 23, wherein said control arm swings into latching contact with said swing arm after said brake pedal is released from a position just beyond said locked position.

25. A method as recited in claim 23, wherein, during the step (B), a dog on said swing engages a detent on said control arm under the assistance of a spring that biases said dog and detent against on another.

26. A method as recited in claim 25, wherein, during said step (A) a toggle arm engages said swing arm so as to hold said dog away from said control arm.

27. A method as recited in claim 25, wherein, during the step (B), said spring moves from a first over-center position in which it pulls said swing arm downwardly to a second over-center position in which it pulls said swing arm upwardly.

28. A method as recited in claim 21, wherein said locking mechanism comprises a swing arm and a roller which is mounted on said swing roller, and wherein, during at least a portion of said step (D)(2), said roller rides on a cam of said brake pedal along a path that is at least generally tangential to a pivot arc of said swing arm, thereby facilitating unlatching of said locking mechanism by said kick-off mechanism.

29. A method as recited in claim 25, wherein during the step (D)(2), said accelerator pedal engages said kick-off mechanism and unlatches said brake pedal within three inches of accelerator pedal movement from an at-rest position thereof.

30. A method of applying and holding a brake of a vehicle comprising:

(A) manually driving a brake pedal to pivot from an at-rest position and into an operating position; then

(B) manually driving said brake pedal through said operating position and to a locked position in which a locking mechanism latches said brake pedal in said locked position, said locked position comprising the sole position in which said brake pedal can be locked with the brakes engaged, and said locking mechanism comprising first and second latching components that do not contact one another until said brake pedal has been depressed sufficiently to be latched in said locked position, thereby providing a single audible indication that said brake pedal has been depressed sufficiently to be latched in said locked position; then

(C) releasing said brake pedal while said brake pedal remains in its locked position; then

(D) unlatching said brake pedal from said locked position by one of

1) manually driving said brake pedal to an over-travel position which is located beyond said locked position and in which said locking mechanism automatically unlatches said brake pedal, and

2) manually driving an accelerator pedal into engagement with a kick-off mechanism to automatically manipulate said locking mechanism to unlatch said brake pedal; and then

(E) permitting said brake pedal to return to said at-rest position.

31. A method of applying and holding a brake of a vehicle comprising:

(A) manually driving a brake pedal to pivot from an at-rest position and into an operating position; then

(B) manually driving said brake pedal through said operating position and to a locked position in which a locking mechanism latches said brake pedal in said locked position; then

(C) releasing said brake pedal while said brake pedal remains in its locked position; then

(D) unlatching said brake pedal from said locked position by manually driving an accelerator pedal into a position in which said accelerator pedal interacts with said locking mechanism to unlatch said brake pedal and to permit said brake pedal to return to said at-rest position, wherein, during said step (D), said interaction between said brake pedal and said locking mechanism imparts no more than 1.0 lbs of resistance to accelerator pedal motion.

32. A method as recited in claim 31, wherein, during said step (D), said interaction between said brake pedal and said locking mechanism imparts no more than 0.5 lbs of resistance to accelerator pedal motion.

33. A method as recited in claim 31, wherein said step (D) is completed in less than 3" of accelerator pedal stroke from an at-rest position thereof.

34. A method as recited in claim 31, wherein, during said step (D), said accelerator pedal engages a kickoff mechanism that is coupled to said locking mechanism.

35. A method as recited in claim 31, wherein said locking mechanism includes a cam mounted on a swing arm and a roller, and wherein said cam and said roller are configured such that, during at least an initial portion of a brake pedal unlatching process, said roller rides along said cam in a path that is at least generally tangential to a pivot arc of said swing arm, thereby facilitating unlocking of said lock mechanism by said kick-off mechanism

36. A vehicle brake system comprising:

(A) at least one hydraulically-actuated vehicle brake;

(B) a manually actuated master cylinder which has an inlet in fluid communication with a hydraulic fluid reservoir and an outlet in fluid communication with said brake, wherein said master cylinder is configured to be locked in an actuated position thereof to hold said brake in an engaged condition; and

(C) a hydraulic accumulator which has an inlet in fluid communication with said outlet of said master cylinder and said brake and which is dimensioned and configured to store energy generated by said master cylinder upon actuation thereof and to use said energy to assist in holding said brake in said engaged condition when said master cylinder is locked in said actuated position thereof.

37. A vehicle brake system as recited in claim 36, wherein said accumulator comprises a spring which is compressed upon master cylinder actuation to store said energy.

38. A vehicle brake system as recited in claim 37, wherein said spring is preloaded so as to set a threshold pressure below which at least substantially all work performed by said master cylinder is applied toward hydraulic pressure intensification and above

which at least a portion of the work performed by said master cylinder is applied towards accumulator spring compression and energy storage.

39. A vehicle brake system as recited in claim 38, further comprising an accumulator drive piston which is driven by said master cylinder to compress said spring.

40. A vehicle brake system as recited in claim 37, wherein said accumulator further comprises a stationary cap on which a first end of said spring is seated and a compression plate on which a second end of said spring is seated and which is movable relative to said cap upon actuation of said master cylinder to compress said spring.

41. A vehicle brake system as recited in claim 40, further comprising a retainer which is mounted on a support and on which said cap and said compression plate are mounted.

42. A vehicle brake system as recited in claim 41, wherein said retainer comprises a mounting plate which is affixed to said support and a plurality of straps which extend generally axially from said mounting plate, wherein said compression plate and said spring are guided by said straps and said cap is fixed to said straps.

43. A vehicle brake system as recited in claim 42, wherein said mounting plate has tangs that lock into slots on said support when said mounting plate is mounted on said support.

44. A vehicle brake system as recited in claim 43, wherein said retainer, said spring, said compression plate, and said cap are configured so as to form a separate preassembleable unit in which said spring is precompressed and which is configured for mounting on said support.

45. A vehicle brake system as recited in claim 36, further comprising a one-way restrictor which permits unrestricted fluid flow from said master cylinder to said accumulator and which inhibits return fluid flow from said accumulator to said master cylinder.

46. A vehicle brake system as recited in claim 45, wherein said one-way restrictor comprises a valve element which, when in a seated position thereof, provides a convoluted flow path from said accumulator to said master cylinder.

47. A vehicle brake system as recited in claim 46, wherein said flow path is a spiral path formed at least in part by a spiral groove in a face of said valve element.

48. A vehicle brake system as recited in claim 36, further comprising a brake pedal which is coupled to said master cylinder and which is selectively latchable in a locked position to lock said master cylinder in said actuated position.

49. A vehicle brake system as recited in claim 48, further comprising an actuator pin which is mounted on said brake pedal and which is operable, upon brake pedal actuation, to translate a piston of said master cylinder to actuate said master cylinder, and wherein said actuator pin is adjustably mounted on said brake pedal so as to eliminate any dead space between said actuator pin and said master cylinder piston.

50. A vehicle brake system as recited in claim 49, wherein said actuator pin is eccentrically mounted on said brake pedal.

51. A vehicle brake system comprising:

(A) at least one hydraulically-actuated vehicle brake;

(B) a manually actuated master cylinder which has an inlet in fluid communication with a hydraulic fluid reservoir and an outlet in fluid communication with said brake, wherein said master cylinder is configured to be locked in an actuated position thereof to hold said brake in an engaged condition;

(C) an accumulator drive piston which is driven by fluid pressure generated by said master cylinder; and

(D) a hydraulic accumulator, said accumulator including

(1) a retainer which includes a) a mounting plate which is mounted on a support and b) a pair of straps which extend away from said mounting plate at least generally in parallel with said accumulator drive piston,

(2) a compression plate which is disposed adjacent said mounting plate in contact with said accumulator drive piston and which is slidably guided by said straps,

(3) a cap which is affixed to said straps at a location which is remote from said mounting plate, and

(4) a compression spring which surrounds said straps and which has a first end seated against said compression plate and a second end seated against said cap.

52. A vehicle brake system as recited in claim 51, wherein said mounting plate has tangs that lock into slots on said support when said mounting plate is mounted on said support.

53. A vehicle brake system as recited in claim 51, wherein said accumulator drive piston is housed in a bore formed in a housing extension of said accumulator, said housing extension being externally threaded, and said mounting plate being internally threaded and screwed onto said housing extension.

54. A vehicle brake system as recited in claim 51, wherein said spring is precompressed between said compression plate and said cap when said accumulator is assembled so as to set a threshold pressure below which a least substantially all work performed by said master cylinder is applied toward hydraulic pressure intensification and above which at least a portion of the work performed by said master cylinder is applied towards accumulator spring compression and energy storage.

55. A vehicle brake system as recited in claim 54, wherein said spring has a free length of about 9", a spring rate of about 25 lbs/in, and is precompressed by at least 3" when said accumulator is assembled.

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56. A hydraulic accumulator which is configured for use in a hydraulic brake system, said accumulator comprising:

(A) a retainer which comprises 1) a mounting plate which is configured for mounting on a support and 2) a plurality of straps which extend at least generally axially away from said mounting ring;

(B) a compression plate which is disposed adjacent said mounting plate and which is slidably guided by said straps;

(C) a cap which is affixed to said straps at a location which is remote from said mounting plate; and

(D) a compression spring which surrounds said straps and which has a first end seated against said compression plate and a second end seated against said cap, wherein said compression spring is precompressed between said compression plate and said cap when said accumulator is assembled, and wherein said entire accumulator is configured to be mounted on a support as a preassembled unit an orientation in which said compression plate is translatable by fluid pressure generated by a master cylinder to compress said compression spring.

57. An accumulator as recited in claim 56, wherein said mounting plate has tangs that lock into slots on the support when said mounting plate is mounted on the support.

58. An accumulator as recited in claim 56, wherein said mounting plate is internally threaded so as to permit said accumulator to be screwed onto the support as a unit.

59. An accumulator as recited in claim 55, wherein said spring has a free length of about 9", a spring rate of about 25 lbs/in, and is precompressed by at least 4" when said accumulator is assembled.

60. A vehicle brake system comprising:

(A) a master cylinder which has an inlet configured for fluid communication with a hydraulic fluid reservoir and an outlet configured for fluid communication with a brake; and

(B) a one-way restrictor which permits unrestricted fluid flow from said master cylinder to the brake but which inhibits return fluid flow from the brake to said master cylinder.

61. A vehicle brake system as recited in claim 60, wherein said one-way restrictor comprises a valve element which, when in a seated position thereof, provides a convoluted restricted flow path from the brake to said master cylinder.

62. A vehicle brake system as recited in claim 61, wherein said flow path is formed at least in part from a spiral groove in a face of said valve element.

63. A vehicle brake system as recited in claim 62, wherein said convoluted flow path provides a restriction that is at least substantially equivalent to an orifice having a diameter of less than 0.0025".

64. A vehicle brake system as recited in claim 63, wherein said convoluted flow path provides a restriction that is at least substantially equivalent to an orifice having a diameter of about than 0.0015".

65. A vehicle brake system as recited in claim 62, wherein said groove has a cross-sectional area of less than 0.001 sq. in and a length of at least one inch.

66. A vehicle brake system as recited in claim 65, wherein said groove has a cross-sectional area of about 0.00063".

67. A brake pedal assembly comprising:

(A) a brake pedal;

(B) a rotatable shaft on which said brake pedal is mounted; and

(C) a damping grease against which said shaft rotates, thereby to inhibit shaft rotation and dampen brake pedal return from an actuated position thereof to a released position thereof.

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68. A method of energizing a hydraulically actuated service brake of a vehicle and holding said brake in its engaged condition, comprising:

(A) driving a brake pedal through an actuation stroke to manually actuate a master cylinder to generate hydraulic pressure, wherein, during a first phase of said actuation stroke, at least substantially all work performed by said master cylinder is applied toward hydraulic pressure intensification, and wherein, during as second phase of said actuation stroke, at least a portion of the work performed by said master cylinder is applied towards energy storage in a hydraulic accumulator;

(B) latching said brake pedal in a locked position in said second phase of said actuation stroke to hold said service brake in its engaged condition with the assistance of stored energy from said accumulator.

69. A method as recited in claim 68, wherein a transition point between said first and second phases of said actuation stroke occurs after a brake lock-up point of said actuation stroke.

70. A method as recited in claim 68, wherein a rate of increase of resistance to additional pedal actuation is substantially higher in said first phase of said actuation stroke than in said second phase.

71. A method as recited in claim 68, wherein said second phase consumes at least 25% of said actuation stroke.

72. A method as recited in claim 71, wherein said second phase consumes at least 60% of said actuation stroke.

73. A method as recited in claim 68, wherein an accumulator spring of said accumulator is compressed during said second phase of said actuation stroke.

74. A method as recited in claim 68, wherein said accumulator spring is precompressed to set a threshold pressure for additional spring compression, said threshold pressure being generated at a transition point between said first and second phases.

75. A method as recited in claim 68, further comprising

(A) releasing said brake pedal from its locked position;

(B) damping return of said brake pedal from said locked position.

76. A method as recited in claim 75, wherein the damping step comprises restricting fluid flow through a valve element located in a fluid flow path from said brake to said master cylinder.

77. A method as recited in claim 76, wherein the step of restricting fluid flow comprises seating a face of said valve element against an end of a bore upon initial return movement of said brake pedal, and then permitting fluid flow to said master cylinder from said brake only through a space formed between said end of said bore and a convoluted groove formed in said face of said valve element.

78. A method as recited in claim 75, wherein the damping step comprises resisting brake pedal movement using a damping grease which contacts a rotating portion of said brake pedal and which facilitates rotation of said portion at relatively slow rotational velocities but which hinders rotation of said portion at relatively high rotational velocities.

79. A method as recited in claim 78, wherein said damping grease is disposed between a stationary tube and a rotating shaft of said brake pedal.

80. In combination;

(A) a hydraulic master cylinder for a braking system; and

(B) a hydraulic accumulator which stores energy generated upon actuation of said master cylinder, wherein said accumulator and said master cylinder are coupled to one another to form an integrated assembly.

81. A combination as recited in claim 80, wherein said master cylinder includes a housing and at least a portion of said accumulator is affixed to said mater cylinder housing.

82. A combination as recited in claim 81, wherein said portion of said accumulator is screwed onto a threaded extension of said master cylinder housing.

83. A brake caliper assembly comprising:

(A) a caliper inboard half subassembly;

(B) a caliper outboard half subassembly; and

(C) a plurality of piston actuators, at least two which are associated with each of said caliper half subassemblies.

84. A brake caliper assembly as recited in claim 83, further comprising elastomeric seals disposed between said half subassemblies to help prevent leakage of hydraulic fluid moving through internal passages within each half subassembly.